

SuperTan® Wet Tantalum Capacitors with Hermetic Seal



Vishay ST represents a major breakthrough in wet tantalum capacitor technology. Its unique cathode system provides the highest capacitance per unit volume. The design facilitates a doubling of capacitance, lower ESR and higher ripple current rating compared with conventional wet tantalum products. Moreover, the ST has the capacitance stability of a solid tantalum capacitor and there are no circuit impedance restrictions.

The ST is housed in an all tantalum, hermetically sealed case and is manufactured to withstand hazardous environments. The ST is used widely in the defense and aerospace industries and whenever there is a space problem.

PERFORMANCE CHARACTERISTICS

Operating Temperature: - 55 °C to + 85 °C (to + 125 °C with voltage derating)

Capacitance Tolerance: At 120 Hz, + 25 °C. ± 20 % standard. ± 10 % available as special.

FEATURES

- Very high capacitance
- 10 µF to 1800 µF
- 25 V_{DC} to 125 V_{DC}
- Very low ESR
- High ripple current
- All Tantalum case
- Hermetically sealed
- Low DCL
- Axial through-hole terminations: Standard tin/lead (Sn/Pb) 100 % tin (RoHS compliant) available
- Compliant to RoHS Directive 2002/95/EC



Note

* Pb containing terminations are not RoHS compliant, exemptions may apply

APPLICATION NOTES

- No continuous reverse voltage permissible.
- The peak of the applied AC ripple and the applied DC voltage must not exceed the DC voltage rating of the capacitor.
- Ripple current ratings by part number at 85 °C and 40 kHz are included in the table. Ripple current correction factors for other temperatures and frequencies are given on the next page.
- Transient reverse voltage surges are acceptable under the following conditions:
The peak reverse voltage does not exceed 1.5 V and the peak current times the duration of the reverse transient does not exceed 0.05 As. In addition, the repetition frequency of the reverse voltage surge is less than 10 Hz.

| DIMENSIONS in inches [millimeters] | | | | |
|------------------------------------|------------------|-----------------------|---|----------------------|
| | | | | |
| CASE CODE | D ± 0.016 [0.41] | MAX. INSULATED (DIA.) | L ₁ + 0.031 [0.79] UNINSULATED | E ± 0.250 [6.3] MAX. |
| T1 | 0.188 [4.78] | 0.219 [5.56] | 0.453 [11.51] | 1.500 [38.10] |
| T2 | 0.281 [7.14] | 0.312 [7.92] | 0.641 [16.28] | 2.250 [57.15] |
| L2 | 0.281 [7.14] | 0.312 [7.92] | 1.008 [25.60] | 2.250 [57.15] |
| T3 | 0.375 [9.52] | 0.406 [10.31] | 0.766 [19.46] | 2.250 [57.15] |
| T4 | 0.375 [9.52] | 0.406 [10.31] | 1.062 [26.97] | 2.250 [57.15] |

Notes

- Material at egress is Tantalum
- Insulation sleeving will lap over the ends of the capacitor case
- Tinned nickel leads, solderable and weldable
- Approx. weight:
T1: 2.3 g, T2: 5.7 g,
T3: 9.4 g, T4: 14.8 g



| ORDERING INFORMATION | | | | | | |
|--|---------------------------------|---|------------------------|--------------------------------------|----------------------------------|---|
| ST Super Tan® COMMERCIAL CAP. TYPE | 220 CAPACITANCE μF | 100 85 °C RATED DC VOLTAGE | T4 CASE CODE | M CAPACITANCE TOLERANCE | I INSULATING SLEEVE | E3 RoHS compliant |
| | | | | M = ± 20 % K = ± 10 % | I = Insulated X = Uninsulated | E3 = 100 % tin termination (RoHS compliant) Blank = SnPb termination (standard design) |

| STANDARD RATINGS | | | | | | | | | | |
|--|--------------|------------------------------|-----------------|------------------------------|--|-------------------------------|----------------|-----------------|---|---------------|
| CAPACITANCE AT 25 °C AND 120 Hz (μF) | CASE CODE | MAX. ESR 120 Hz (Ω) | MAX. DCL AT | | MAX. IMP. AT - 55 °C AND 120 Hz (Ω) | MAX. CAPACITANCE CHANGE AT | | | AC RIPPLE 85 °C 40 kHz (mA) RMS | PART NUMBER |
| | | | + 25 °C (μA) | + 85 °C/ + 125 °C (μA) | | - 55 °C (%) | + 85 °C (%) | + 125 °C (%) | | |
| 25 V_{DC} AT 85 °C; 15 V_{DC} AT 125 °C | | | | | | | | | | |
| 120 | T1 | 1.3 | 1 | 5 | 25 | - 42 | + 8 | + 12 | 1250 | ST120-25T1MI |
| 560 | T2 | 0.83 | 2 | 10 | 12 | - 65 | + 10 | + 15 | 2100 | ST560-25T2MI |
| 1100 | L2 | 0.5 | 3 | 25 | 7 | - 60 | + 20 | + 45 | 3200 | ST1100-25L2MI |
| 1200 | T3 | 0.65 | 5 | 20 | 7 | - 70 | + 12 | + 18 | 2600 | ST1200-25T3MI |
| 1800 | T4 | 0.5 | 6 | 25 | 7 | - 72 | + 12 | + 20 | 3100 | ST1800-25T4MI |
| 30 V_{DC} AT 85 °C; 20 V_{DC} AT 125 °C | | | | | | | | | | |
| 100 | T1 | 1.3 | 1 | 5 | 25 | - 38 | + 8 | + 12 | 1200 | ST100-30TMI |
| 470 | T2 | 0.85 | 2 | 10 | 15 | - 65 | + 10 | + 18 | 1800 | ST470-30T2MI |
| 950 | L2 | 0.5 | 5 | 30 | 7 | - 55 | + 18 | + 35 | 3200 | ST950-30L2MI |
| 1000 | T3 | 0.7 | 7 | 25 | 7 | - 70 | + 10 | + 18 | 2500 | ST1000-30T3MI |
| 1500 | T4 | 0.6 | 12 | 35 | 6 | - 72 | + 10 | + 20 | 3000 | ST1500-30T4MI |
| 50 V_{DC} AT 85 °C; 30 V_{DC} AT 125 °C | | | | | | | | | | |
| 68 | T1 | 1.5 | 1 | 5 | 35 | - 25 | + 8 | + 15 | 1050 | ST68-50T1MI |
| 220 | T2 | 0.9 | 2 | 10 | 17.5 | - 50 | + 8 | + 15 | 1800 | ST220-50T2MI |
| 450 | L2 | 0.6 | 3 | 25 | 7.5 | - 45 | + 12 | + 30 | 2900 | ST450-50L2MI |
| 470 | T3 | 0.75 | 3 | 25 | 10 | - 45 | + 8 | + 15 | 2100 | ST470-50T3MI |
| 680 | T4 | 0.7 | 5 | 40 | 8 | - 58 | + 10 | + 20 | 2750 | ST680-50T4MI |
| 60 V_{DC} AT 85 °C; 40 V_{DC} AT 125 °C | | | | | | | | | | |
| 47 | T1 | 2.0 | 1 | 5 | 44 | - 25 | + 8 | + 12 | 1050 | ST47-60T1MI |
| 150 | T2 | 1.1 | 2 | 10 | 20 | - 40 | + 8 | + 15 | 1800 | ST150-60T2MI |
| 370 | L2 | 0.6 | 3 | 25 | 9 | - 33 | + 9 | + 20 | 2900 | ST370-60L2MI |
| 390 | T3 | 0.9 | 3 | 25 | 15 | - 45 | + 8 | + 15 | 2100 | ST390-60T3MI |
| 560 | T4 | 0.8 | 5 | 40 | 10 | - 58 | + 8 | + 15 | 2750 | ST560-60T4MI |
| 75 V_{DC} AT 85 °C; 50 V_{DC} AT 125 °C | | | | | | | | | | |
| 33 | T1 | 2.5 | 1 | 5 | 66 | - 25 | + 5 | + 9 | 1050 | ST33-75T1MI |
| 110 | T2 | 1.3 | 2 | 10 | 24 | - 35 | + 6 | + 10 | 1650 | ST110-75T2MI |
| 250 | L2 | 0.8 | 5 | 30 | 12 | - 30 | + 6 | + 15 | 2500 | ST250-75L2MI |
| 330 | T3 | 1.0 | 3 | 30 | 12 | - 45 | + 6 | + 10 | 2100 | ST330-75T3MI |
| 470 | T4 | 0.9 | 5 | 50 | 12 | - 50 | + 6 | + 10 | 2750 | ST470-75T4MI |

Notes

- (K = ± 10 %, M = ± 20 %) and insulation letter (I = Insulation, X = Uninsulated)
- Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 units, change the digit following the letter "X" from "0" to "9". For units with outer plastic-film insulation, substitute "2" for "0" at the end of the part number
- For RoHS compliant add "E3" for suffix



| STANDARD RATINGS | | | | | | | | | | |
|---|--------------|------------------------------|-----------------|------------------------------|--|-------------------------------|----------------|-----------------|---|---------------|
| CAPACITANCE AT 25 °C AND 120 Hz (μF) | CASE CODE | MAX. ESR 120 Hz (Ω) | MAX. DCL AT | | MAX. IMP. AT - 55 °C AND 120 Hz (Ω) | MAX. CAPACITANCE CHANGE AT | | | AC RIPPLE 85 °C 40 kHz (mA) RMS | PART NUMBER |
| | | | + 25 °C (μA) | + 85 °C/ + 125 °C (μA) | | - 55 °C (%) | + 85 °C (%) | + 125 °C (%) | | |
| 100 V_{DC} AT 85 °C; 65 V_{DC} AT 125 °C | | | | | | | | | | |
| 15 | T1 | 3.5 | 1 | 5 | 125 | - 18 | + 3 | + 10 | 1050 | ST15-100T1MI |
| 68 | T2 | 2.1 | 2 | 10 | 37 | - 30 | + 4 | + 12 | 1650 | ST68-100T2MI |
| 120 | L2 | 1.0 | 3 | 25 | 20.5 | - 30 | + 4 | + 12 | 2200 | ST120-100L2MI |
| 150 | T3 | 1.6 | 3 | 25 | 22 | - 35 | + 6 | + 12 | 2100 | ST150-100T3MI |
| 220 | T4 | 1.2 | 5 | 50 | 15 | - 40 | + 6 | + 12 | 2750 | ST220-100T4MI |
| 125 V_{DC} AT 85 °C; 85 V_{DC} AT 125 °C | | | | | | | | | | |
| 10 | T1 | 5.5 | 1 | 5 | 175 | - 15 | + 3 | + 10 | 1050 | ST10-125T1MI |
| 47 | T2 | 2.3 | 2 | 10 | 47 | - 25 | + 5 | + 12 | 1650 | ST47-125T2MI |
| 90 | L2 | 1.3 | 5 | 25 | 25 | - 22 | + 4 | + 15 | 2000 | ST90-125L2MI |
| 82 | T3 | 1.8 | 3 | 25 | 40 | - 35 | + 5 | + 12 | 1950 | ST82-125T3MI |
| 100 | T3 | 1.8 | 3 | 25 | 35 | - 35 | + 5 | + 12 | 2100 | ST100-125T3MI |
| 150 | T4 | 1.6 | 5 | 50 | 20 | - 35 | + 6 | + 12 | 2750 | ST150-125T4MI |

Notes

- (K = ± 10 %, M = ± 20 %) and insulation letter (I = Insulation, X = Uninsulated)
- Part numbers shown are for units with ± 20 % capacitance tolerance and uninsulated capacitors. For ± 10 units, change the digit following the letter “X” from “0” to “9”. For units with outer plastic-film insulation, substitute “2” for “0” at the end of the part number
- For RoHS compliant add “E3” for suffix

| RIPPLE CURRENT MULTIPLIERS VS. FREQUENCY, TEMPERATURE AND APPLIES PEAK VOLTAGE | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------|--------|------|------|------|--------|------|------|------|-------|------|------|------|--------|------|------|------|--------|------|------|------|---------|------|------|------|
| FREQUENCY OF APPLIED RIPPLE CURRENT | | 120 Hz | | | | 800 Hz | | | | 1 kHz | | | | 10 kHz | | | | 40 kHz | | | | 100 kHz | | | |
| | | ≤ 55 | 85 | 105 | 125 | ≤ 55 | 85 | 105 | 125 | ≤ 55 | 85 | 105 | 125 | ≤ 55 | 85 | 105 | 125 | ≤ 55 | 85 | 105 | 125 | ≤ 55 | 85 | 105 | 125 |
| % of 85 °C rated peak voltage | 100 % | 0.60 | 0.39 | - | - | 0.71 | 0.43 | - | - | 0.72 | 0.46 | - | - | 0.88 | 0.55 | - | - | 1.0 | 0.63 | - | - | 1.1 | 0.69 | - | - |
| | 90 % | 0.60 | 0.46 | - | - | 0.71 | 0.55 | - | - | 0.72 | 0.55 | - | - | 0.88 | 0.67 | - | - | 1.0 | 0.77 | - | - | 1.1 | 0.85 | - | - |
| | 80 % | 0.60 | 0.52 | 0.35 | - | 0.71 | 0.62 | 0.42 | - | 0.72 | 0.62 | 0.42 | - | 0.88 | 0.76 | 0.52 | - | 1.0 | 0.87 | 0.59 | - | 1.1 | 0.96 | 0.65 | - |
| | 70 % | 0.60 | 0.58 | 0.44 | - | 0.71 | 0.69 | 0.52 | - | 0.72 | 0.70 | 0.52 | - | 0.88 | 0.85 | 0.64 | - | 1.0 | 0.97 | 0.73 | - | 1.1 | 1.07 | 0.80 | - |
| | 66 2/3 % | 0.60 | 0.60 | 0.46 | 0.27 | 0.71 | 0.71 | 0.55 | 0.32 | 0.72 | 0.72 | 0.55 | 0.32 | 0.88 | 0.88 | 0.68 | 0.40 | 1.0 | 1.0 | 0.77 | 0.45 | 1.1 | 1.1 | 0.85 | 0.50 |



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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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